# Improving Motor Skills and Math Logic through the Method of Traditional Games Engklek in Early Childhood

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Abstract—The purpose of the research is to increase motoric ability and mathematical logic for early children through playing engklek traditional game. The basic subject of the research is on group B Permata Bunda kindergarten by using the experimental design. The method of this research is action research which using the technique of collecting and monitoring the activity sheet of the descriptions of the data analysis. This procedure involves four phases. They are planning, action, observation and reflection. The results showed that the implementation of Engklek traditional games increased students motoric skills and mathematical logic student. Engklek Traditional game is more effective than conventional learning in the experimental phase.

Keywords—motoric; mathematical logic; engklek traditional game

## I. INTRODUCTION

The problems that have existed so far are the low ability to recognize numbers, interest, concentration, initiative, ways of comparing, ways of thinking, and solving problems and maximizing the gross motor skills of children so that children feel bored while in school.

Playing is a child's need, because by playing children will get the opportunity to develop their potential, find themselves, motivate children to know something more deeply [1]. Playing moves to develop large muscles (gross motor skills) including jumping, climbing, rolling and running. The experience of limbs during play makes children develop moving skills and feel confident in their body strength, playing to support intellectual development, games are a source of development [2]. The game requires logic to move, from living movements to effective strategies, mathematical thinking as a whole, systematic and logical pattern [3].

According to Piaget the age of children (2-7 years) is at the pre-operational phase with the characteristics of using symbols and arranging of internal responses (in playing, language and imitation) [4], therefore teachers have to design comfortable learning so that children enjoy study. Learning must have a lot of varieties. It has to be interesting according to the characteristics of children who are always curious and challenging.

The implementation of the methods Engklek traditional game is one of the learning models which can increase the interest and exploration of children directly in increasing motoric skills and mathematical logic.

The result of interview showed that teacher of group B teach using monotonous way in learning process. It can make children bored and depressed in the learning process, according to Montolalu By playing, the experiences use concrete object can develop understanding in solving problem, have interaction with friend, and ability to use logic or good sense. Sujiono argues that through games children can develop all of their capabilities optimally not only physical and mental, but also intellectual and spiritual [5]. Based on facts above, the writer is interested on conducting classroom action research (PTK) about the influence of playings methods of Engklek traditional games toward motoric skills and mathematical logic in early children. Montolalu stated that playing is a fun learning process [1]. It can help children to know their world, to develop new concept, brave to take a risk, increase social skill and form behaviour. Futhermore, playing is a fun method. it is liked by children. children can develop their basic abilty including rough motoric can be developed [6].

There are some principles in developing rough motoric to children in kindergarten a) giving freedom for expression, b) managing time, place, media in order to stimulate children for being creative, c) establishing courage and avoiding some ways which destroying courage and children growth, d) giving fun and creating comfortable circumstances to children and monitoring all aspect of activities implementation [7].

The indicator of rough motoric in Engklek traditional game are ; the ability to coordinate eye with hand, the flexiblity of wrist muscle in throwing "kreweng", the endurance of leg muscle, the agility, the body balance, the endurance in playing, the expression, the precision, the accuracy in passing line, skilled in using right hand and the speed in jumping.

The intelligence of Mathematical logic is the ability to handle numbers and calculations, patterns and thoughts of scientific logic [8].

It is suitable with the opinion defined mathematical logic is an ability to use good sense, to do reasonable thought and also the ability to solve problem, to develop and to create something with number and logic [9]. The Indicator of mathematical logic is thinking numerically and in the context of patterns, logical sequences, causation, and categorical [10].

Children can develop and practice rough motoric by playing Engklek traditioanal game, The growth of good rough motoric nerve will help children more active, make the immune is rougher. Children has flexible body, Good sport uses playing element [11].

### II. THE METHODOLOGY OF THE RESEARCH

The research is a classroom action research (*Classroom Action Research*) Classroom action research is held to improve the quality process and the learning process at school. Classroom action research has four phases of activity. They are : planning, implementation of action, the collection of action data, analysis and reflection [12].

The activities of planning phase are to prepare media, to arrange research instrument, to pepare the sheet of activitys observation. In implementation phase, it is held by looking at motoric ability and children mathematical logic in assessment and observation for each cycle ending.

Data collection is carried out together with the phase of the implementation of action. Analysis is done after data is collected by comparing some points which are reached in each action ending (cycle) and using specified indicator. Reflection is done in each cycle ending. It is useful for looking s ome lacks on preview action. It is also as the basic of improvement for next cycle [13]. The hypothesis testing is done in each cycle to see the achievement of children. The hypothesis testing is done through independent test toward the influence of the achievement of children in motoric ability and mathematical logic.

The classroom action research is held at group B Permata Bunda kindergarten in Arga Makmur, North Bengkulu. The result of data in the research is qualitative data, qualitative data is obtained from the assessment, it is the assessment on the first cycle and the assessment on the next cycle, while the qualitative data is obtained from the children observation sheet during learning process. The expected intervention results are the criteria of successfull in the classroom action research if the average variable value reaches a high minimum quality with 80% of children, The indicator that becomes successful reference in the research is the level of the learning achievement [14].

## III. RESULT

From the result of the research, There are some datas observation of action effect which can be interpreted in each cycle they are:

## A. Intrepretation of the Beginning Study

The diffrences of the beginning study in Permata Bunda Kindergarten found there are some lacks of supporting

facilities which related in increasing children motoric ability and children mathematical logic such as out door playing, swing, slidding board and props for the mathematical logic.

Children felt depression. They were boring because there was no challenge in learning. Learning was more dominant in reading, writing, and counting, so that the curiosity, energy, the style of children who always active and full of experiment would be dissappear. Futhermore, unsupportive environmental factor could give bad influence to children, for instance, teacher was not creative but monotonous in learning process.

Based on the results of the interpretation above, the researchers tried to observe the influence of playing method of Engklek traditional game toward motoric ability and mathematical logic fully and correctly.

1) Description and the result of classroom action research (phase 1)

*a) The ability of rough motoric:* Based on the results of rough motoric observation of children in each cycle, it was obtained data as follow:

TABLE I.	THE RESULT OF ROUGH MOTORIC OBSERVATION OF
	CHILDREN IN EACH CYCLE

Cycle	Score motoric skill	Category
First	2,56	Enough
Second	2,92	Enough
Third	3,24	Good

Table 1 defines first cycle of the results of rough motoric observation of children with the influence of Engklek traditional game was categorized on enough. Most children still didn't understand the rule of the games. Children movements were stiff and unconditioned well.

First cycle, teachers must give motivation and explanation about the rule of the game accurately to children, so that children can more involved in playing.

Second cycle, children involved more active in playing activity, children have understood the rule of the game. Teacher divided children into 3 groups, each group consists of five people. The agility of movement is more increasing, there are some good changes of children enthusiasm of playing, chlidren expression, sportivity, the speed of children in jumping.

Third cycle, the ability of rough motoric of children has increased significantly. Children have understood the rules of the game. The endurance of leg muscles and the agility in movement are good too. Not only flexibility of wrist muscles, skilled in using the right hand, body balance, endurance in play, expression, accuracy when throwing " kreweng ", are good but also the the sportivity and and the speed in jumping are good.

*b) The ability of mathematical logic:* Based on the result of the observation of the ability of the mathematical logic in each cycle, the data was obtained as follow:

 
 TABLE II.
 The Result of the Observation of the Mathematical Logic in Each Cycle

Cycle	Score of math logic	Category
First	2,49	Enough
Second	3,16	Good
Third	3,56	Good

Table 2 defines first cycle as an assessment of the mathematical logic which has been observed during the activity are the aspect of making swath pattern in playing, firmness in making pattern lines, self-sustained, matching numbers according to their symbols and recognizing number symbols. But children still needs guidance in recognizing numbers in accordance with the symbol, so the teacher needs to evaluate the next steps.

In the second cycle, the ability of children mathematical logic has changed, children are able to recognize the symbol number, mention numbers and match numbers according to the symbol, it can be seen from the obtained score is 3.16, it has been already in good criteria, eventhough there are some children still need teacher help in making swath patterns and pattern lines.

In the third cycle, the ability of children mathematical logic has increased significantly, children are able to make swath patterns in playing, firmness in making pattern lines, independence, matching numbers according to their symbols, recognizing numbers and mentioning numbers. Children do not have doubt in doing their activity.

The ability of children mathematical logic has increased each cycle, it is because of the implementation of activities has improved continously.

Based on the results of motoric assessment for children each cycle.

TABLE III. RECAPITULATION OF THE RESULTS OF THE ASSESSMENT

Cycle	Score of recapitulation assessment	Percent Category
First	2,6	47 %
Second	2,9	67 %
Third	3,2	87%

Based on table 3 the results of the analysis of increasing rough motoric skills of children before being given treatment as follows; before being given treatment the average of rough motoric was 2.6 with classical learning completeness in the amount of 47% in the first cycle, and the average of 2.9 with classical completeness in the amount of 67% in the second cycle, after being given treatment, the average rough motoric of children 3.2 with classical learning completeness in the amount of 87%.

The results are obtained ; t count = 3.794 and t table = 2.145 at  $\alpha = 0.05$ . Because of t count (3.794) and t table = (2.145), so based on the examination criteria means HO is rejected. It shows that there is an the influence of playing method of Engklek traditional game toward the ability of rough motoric.

In the second cycle, the average of rough motoric of children was 2.9 with classical learning completeness in the amount of 67%.

The results are obtained ; t arithmetic = 4.983 and t table = 2.145 at  $\alpha = 0.05$  because of t count (4.983) and t table (2.145), so based on the examination criteria means HO is rejected, it indicates that there is an increasing of the ability of rough motoric of children after applying Engklek traditional games.

In the third cycle the average of rough motoric of children was 3.2 with 87% classical completeness. The examination of the hypothesis in this study examines whether the ability of rough motoric are better after being given treatment. The t-test formula is used paired statistical samples to test the hypothesis.

The results are obtained ; t arithmetic = 3.598 and t table = 2.145 at  $\alpha = 0.05$ . So that based on the examination criteria means HO is rejected. It shows that there is an increasing of the ability of rough motoric after the applying the method of the Engklek traditional game.

Based on the data analysis of the improvement of the ability of children mathematical logic before and after being given treatment, the following results were obtained, the average of the ability of children mathematical logic in the first cycle was 2.49 with classical completeness in the amount of 33%.

The results are obtained; t arithmetic = 2.726 and t table = 2.145 at  $\alpha = 0.05$ . Because of t count > t table so that based on the examination criteria means Ho is rejected. It shows that there is an increasing of the ability of children mathematical logic after the method of playing Engklek traditional games is applied.

In the second cycle the average of children mathematical logic is 2.8 with classical completeness in the amount of 60%. t-test paired statistical samples were used for examining the hypothesis.

The results are obtained ; t arithmetic = 4.876 and t table = 2.145. From the table above, it is known that t count > t table at  $\alpha = 0.05$ , so it can be concluded that there is an increasing of the ability of children mathematical logic after applying the method of Engklek traditional game.

In the third cycle the average of children mathematical logic was 3.3 with classical completeness in the amount of 93%. Examination of the hypothesis in this study is whether the ability of children mathematical logic has increased if it is compared to previous learning. Formula t test paired statistics is used to test the hypothesis.

The results are obtained ; t arithmetic = 5.598 and t table = 2.145 at  $\alpha$  = 0.05, from the table above it is known that t count > t table, so it can be concluded that the influence of the method of Engklek traditional game can improve the ability of children mathematical logic.

Whereas the group who being taught with conventional learning models with the number of children (n) 15 children has the average of rough motoric in the amount of 2.0 and mathematical logic in making a pattern in the amount of 2.1 and matching of numbers in the amount of 2.0.

The examination of the hypothesis in the research is whether the averages rough motoric and mathematical logic that using the application of traditional games are better than the averages of rough motoric and mathematical logic that using conventional learning models.

Based on the results of hypothesis examination used the t test, the results are obtained ; t count rough motoric = 7.240, t count on mathematical logic in making patterns = 5.20, t count on mathematical logic in matching numbers = 10,170, and t table = 2, 145 in  $\alpha$  = 0.05 because t test > t table, so that based on the examination criteria means HO is rejected, it shows that there are differences between the average of rough motoric and mathematical logic that using the application of Engkek traditional games with the application that using conventional learning models.

It shows that the assessment of rough motoric and mathematical logic that using the application of Engklek traditional games is better than the assessment of rough motoric and mathematical logic that using conventional learning models.

#### IV. DISCUSSION

Based on the research, it was found that through the application of traditional game playing methods, gross motor skills and math logic were increased, this was due to the learning of the teacher applying the playing method so that the children felt happy and became more active. Dewey, argues "Learning by doing" wherein the learning process children must do [15]. Kurniasih, argues that developing by playing, by playing children using their body muscles, stimulates their senses and exploring the surrounding world [16]. Trianto in active learning of children physically and mentally in expressing reasoning, finding links to one another, communicate the right ideas and use them to solve problems [17].

This is in accordance with previous research, among others, that the use of Engklek traditional play models is one way for children to be more easily improving their motor skills with more regular [18-22].

#### V. CONCLUSION

The ability of motoric and mathematical logic has increased significantly in each cycle. It starts from the first cycle to the third cycle. The application of the method of Engklek traditional game can improve motoric ability and mathematical logic because there is a coordination between hand and eye through this game. Children have regular movement, Children are more agility than before, Children more accurate in doing something, Children has better endurance, Children are better in using the right hand. The flexibility of wrist muscles is better Through this game, the children has learned in making patterns, practicing firmness in making lines of patterns, independence and pairing numbers according to their symbols, arranging the symbol of numbers and mentioning numbers in a fun way.

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